Orchards at Farnsworth Farms

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Traffic Impact Study



Sandy, Utah

June 4, 2020

UT20-1646



Sandy Orchards at Farnsworth Farms Traffic Impact Study

EXECUTIVE SUMMARY

This study addresses the traffic impacts associated with the proposed Orchards at Farnsworth Farms development located in Sandy, Utah. The project is located on the west side of 700 East between 11000 South and 11400 South.

Included within the analyses for this study are the traffic operations and recommended mitigation measures for existing conditions and plus project conditions (conditions after development of the proposed project) at key intersections and roadways near the site. The evening peak hour level of service (LOS) was computed for each study intersection. The results of this analysis are shown in Table ES-1. Recommended changes to storage lengths are shown in Table ES-2.

TABLE ES-1 LOS Analysis - Evening Peak Hour Sandy - Orchards at Farnsworth Farms TIS								
	Lev	el of Service (Sec/	Veh)					
Intersection	Existing (2020)							
	Background	Background Mitigated	Plus Project					
11000 South / 700 East	C (22.0)	C (21.6)	C (21.4)					
Dusty Creek Avenue / 700 East	d (31.7) / WBL	d (31.8) / WBL	d (29.7) / WBL					
700 East / 11400 South	E (59.3)	D (48.5)	D (50.1)					
North Access / 700 East	-	-	a (4.6) / EBR					
South Access / 700 East a (5.2) / EBR								
 Intersection LOS and delay (seconds/vehicle) values represent the overall intersection average for roundabout, signalized, all-way stop-controlled intersections and the worst approach for all other unsignalized intersections. Uppercase LOS used for signalized, roundabout, and all-way stop-controlled intersections. Lowercase LOS used for one-way & two-way stop-controlled intersections. 								

Source: Hales Engineering, June 2020

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TABLE ES-2 Recommended Storage Lengths Sandy - Orchards at Farnsworth Farms TIS								
Storage Length (feet)								
Intersection	Northbound		South	bound	Eastbound		Westbound	
	LT	RT	LT	RT	LT	RT	LT	RT
700 East / 11400 South	-	-	-	-	400	-	250	-
Source: Hales Engineering, June 2020								

SUMMARY OF KEY FINDINGS/RECOMMENDATIONS

The following is a summary of key findings and recommendations:

- The project accesses 700 East (SR-71), which is maintained by UDOT as an access category 5 roadway.
- Traffic Volume Adjustments:
 - Traffic volumes were collected on Wednesday, March 18, 2020 during the COVID-19 pandemic when traffic volumes were lower than normal.
 - Therefore, previous counts collected at the 11000 South / 700 East intersection from September 2019 were referenced to make adjustments. The September 2019 volumes were increased by 3% to estimate an average 2020 weekday.
 - The adjusted September 2019 traffic volumes were approximately 110% higher than those collected on March 18. Therefore, the collected data were increased by 110% to represent normal conditions. The adjusted September 2019 volumes at 11000 South / 700 East were used directly in the analysis.
 - In addition, the trips generated by the proposed Thackeray Townhome project on 700 East were added to the background traffic.
- The 700 East / 11400 South intersection is currently operating at LOS E during the evening peak hour in <u>existing (2020) background conditions</u>. Queueing is anticipated at both the 11000 South and 11400 South intersections on 700 East.
 - <u>Recommendation</u>: That permissive-protected phasing be implemented on the southbound left-turn movement of the 11000 South / 700 East intersection to mitigate queueing. This left-turn phasing is currently warranted at this location based on UDOT left-turn phasing guidelines.
 - <u>Recommendation</u>: That signal timing be adjusted at the 700 East / 11400 South intersection to better accommodate the demand, including shifting more green time to the eastbound movements during the evening peak hour.
 - <u>Recommendation</u>: That the storage lengths of the east- and westbound leftturn lanes at the 700 East / 11400 South intersection be extended to accommodate queueing. See Table ES-2 for recommended storage lengths.
- The development will consist of 116 residential townhomes.
 - Both project accesses were assumed to be right-in, right-out (RIRO) accesses.
 The South Access was assumed to be RIRO due to the offset with Dusty Creek Avenue. This resulted in some U-turns at 11000 South and 11400 South.
- All study intersections are anticipated to operate at an acceptable LOS during the evening peak hour in <u>existing (2020) plus project conditions</u>.

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I. INTRODUCTION

A. Purpose

This study addresses the traffic impacts associated with the proposed Orchards at Farnsworth Farms development located in Sandy, Utah. The proposed project is located on the west side of 700 East in between 11000 South and 11400 South. Figure 1 shows a vicinity map of the proposed development.

Included within the analyses for this study are the traffic operations and recommended mitigation measures for existing conditions and plus project conditions (conditions after development of the proposed project) at key intersections and roadways near the site.



Figure 1: Vicinity map showing the project location in Sandy, Utah

B. Scope

The study area was defined based on conversations with the development team. This study was scoped to evaluate the traffic operational performance impacts of the project on the following intersections:

- 700 East / 11000 South
- 700 East / 11400 South
- Dusty Creek Avenue / 700 East
- Project Accesses (2) / 700 East

C. Analysis Methodology

Level of service (LOS) is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. Table 1 provides a brief description of each LOS letter designation and an accompanying average delay per vehicle for both signalized and unsignalized intersections. Figure 2 provides a visual representation of each LOS letter designation.

The *Highway Capacity Manual* (HCM), 6th Edition, 2016 methodology was used in this study to remain consistent with "state-of-the-practice" professional standards. This methodology has different quantitative evaluations for signalized and unsignalized intersections. For signalized and all-way stop intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). For all other unsignalized intersections, LOS is reported based on the worst movement.

Using Synchro/SimTraffic software, which follow the HCM methodology, the peak hour LOS was computed for each study intersection. Multiple runs of SimTraffic were used to provide a statistical evaluation of the interaction between the intersections. The detailed LOS reports are provided in Appendix B. Hales Engineering also calculated the 95th percentile queue lengths for the study intersections using SimTraffic. The detailed queue length reports are provided in Appendix D.

D. Level of Service Standards

For the purposes of this study, a minimum acceptable intersection performance for each of the study intersections was set at LOS D. If levels of service E or F conditions exist, an explanation and/or mitigation measures will be presented. A LOS D threshold is consistent with "state-of-the-practice" traffic engineering principles for urbanized areas.

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Table 1: Level of Service Description

Level of Service	Description of Traffic Conditions	Average Delay (seconds/vehicle)
	Signalized Intersections	Overall Intersection
A	Extremely favorable progression and a very low level of control delay. Individual users are virtually unaffected by others in the traffic stream.	0 ≤ 10.0
В	Good progression and a low level of control delay. The presence of other users in the traffic stream becomes noticeable.	> 10.0 and ≤ 20.0
С	Fair progression and a moderate level of control delay. The operation of individual users becomes somewhat affected by interactions with others in the traffic stream.	>20.0 and ≤ 35.0
D	Marginal progression with relatively elevated levels of control delay. Operating conditions are noticeably more constrained.	> 35.0 and ≤ 55.0
Е	Poor progression with unacceptably elevated levels of control delay. Operating conditions are at or near capacity.	> 55.0 and ≤ 80.0
F	Unacceptable progression with forced or breakdown operating conditions.	> 80.0
	Unsignalized Intersections	Worst Approach
А	Free Flow / Insignificant Delay	0 ≤ 10.0
В	Stable Operations / Minimum Delays	>10.0 and ≤ 15.0
С	Stable Operations / Acceptable Delays	>15.0 and ≤ 25.0
D	Approaching Unstable Flows / Tolerable Delays	>25.0 and ≤ 35.0
Е	Unstable Operations / Significant Delays Can Occur	>35.0 and ≤ 50.0
F	Forced Flows / Unpredictable Flows / Excessive Delays Occur	> 50.0

Source: Hales Engineering Descriptions, based on the *Highway Capacity Manual* (HCM), 6th Edition, 2016 Methodology (Transportation Research Board)





Figure 2: Visual representation of the LOS letter designations

II. EXISTING (2020) BACKGROUND CONDITIONS

A. Purpose

The purpose of the background analysis is to study the intersections and roadways during the peak travel periods of the day with background traffic and geometric conditions. Through this analysis, background traffic operational deficiencies can be identified, and potential mitigation measures recommended. This analysis provides a baseline condition that may be compared to the build conditions to identify the impacts of the development.

B. Roadway System

The primary roadways that will provide access to the project site are described below:

<u>700 East (SR-71)</u> – is a state-maintained roadway (classified by UDOT access management standards as a "Regional – Priority Urban Importance" facility, or access category 5 roadway). 700 East has two travel lanes in each direction separated by a center two-way left-turn lane (TWLTL). As identified and controlled by UDOT, a "Regional – Urban Importance" access classification identifies minimum signalized intersection spacing of one-half mile (2,640 feet), minimum unsignalized street spacing of 660 feet, and minimum driveway spacing of 350 feet. The posted speed limit on 700 East is 40 mph.

<u>11000 South</u> – is a city-maintained roadway which is classified by the Sandy Transportation Master Plan (November 2009) as a "major collector." The roadway has one travel lane in each direction separated by a center TWLTL. The posted speed limit is 35 mph in the study area.

<u>11400 South</u> – is a city-maintained roadway which is classified by the Sandy Transportation Master Plan (November 2009) as a "major arterial." The roadway has two travel lanes in each direction separated by a center TWLTL. The posted speed limit is 40 mph in the study area.

C. Traffic Volumes

Weekday morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak period traffic counts were performed at the following intersections:

- 700 East / 11000 South
- 700 East / 11400 South
- Dusty Creek Avenue / 700 East

The counts were performed on Wednesday, March 18, 2020. The morning peak hour was determined to be between 8:00 and 9:00 a.m., and the evening peak hour was determined to be between 5:00 and 6:00 p.m. The evening peak hour volumes were up to 20% higher than the morning peak hour volumes. Therefore, the evening peak hour volumes were used in the analysis to represent the worst-case conditions. Detailed count data are included in Appendix A.

The traffic counts were collected during the COVID-19 pandemic when traffic volumes were slightly reduced due to social distancing measures. Hales Engineering referred to older counts taken at the 11000 South / 700 East intersection on Thursday, September 12, 2019. These volumes were increased by 3% to estimate an average 2020 weekday. The adjusted 2020 traffic volumes were approximately 110% higher than those collected on March 18. Therefore, the collected data were increased by 110% to represent normal conditions. The older adjusted counts at 11000 South / 700 East were used directly in the analysis.

In addition, Hales Engineering inserted the anticipated trips being generated by the proposed Thackeray Townhome project north of 11000 South on 700 East. Based on the TIS completed for that project in October 2019, it is anticipated that the project will generate approximately 28 evening peak hour trips. It was assumed that 35% of these trips will pass through the 11000 South / 700 East intersection to assign these to the network.

Figure 3 shows the existing evening peak hour volumes as well as intersection geometry at the study intersections.

D. Level of Service Analysis

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Hales Engineering determined the 700 East / 11400 South intersection is currently operating at LOS E during the evening peak hour, as shown in Table 2. These results serve as a baseline condition for the impact analysis of the proposed development during existing (2020) conditions.

Intersection	Lev	el of Service		
Description	Control	Movement ¹	Aver. Delay (Sec/Veh)	LOS ²
11000 South / 700 East	Signal	-	22.0	С
Dusty Creek Avenue / 700 East	WB Stop	WBL	31.7	d
700 East / 11400 South	Signal	-	59.3	E
1. Movement indicated for unsignalized intersections where delay ar	nd LOS represents worst	movement. SBL = South	bound left movement, etc	5.

Table 2: Existing (2020) Background Evening Peak Hour LOS

2. Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for non-AWSC intersections.

Source: Hales Engineering, June 2020

E. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. A 95th percentile queue length of over 1,000 feet is anticipated on the eastbound approach of the 700 East / 11400 South intersection. A 95th percentile queue length of approximately 320 feet is anticipated on the southbound approach of the 11000 South / 700 East intersection.

Sandy Orchards at Farnsworth Farms TIS Existing (2020) Background

Evening Peak Hour Figure 3



Hales Engineering 1220 North 500 West, Ste. 202 Lehi, Utah 84043

801.766.4343 06/04/2020

F. Mitigation Measures

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It is recommended that permissive-protected phasing be implemented on the southbound leftturn movement of the 11000 South / 700 East intersection to mitigate queueing. This phasing is currently warranted at this location based on UDOT left-turn phasing guidelines.

It is recommended that signal timing be adjusted at the 700 East / 11400 South intersection to better accommodate the demand. This may include shifting more green time to the eastbound movements during the evening peak hour.

It is also recommended that the storage lengths of the east- and westbound left-turn lanes at the 700 East / 11400 South intersection be extended to accommodate queueing. See Section IV.F for recommended storage lengths.

G. Mitigated Scenario

Hales Engineering completed an additional existing (2020) background scenario with the proposed mitigation measures implemented. As shown in Table 3, it is anticipated that all study intersections will operate at acceptable levels of service with the proposed mitigation measures. It is anticipated that these improvements will also significantly reduce the identified queue lengths.

Intersection	Lev	el of Service		
Description	Control	Movement ¹	Aver. Delay (Sec/Veh)	LOS ²
11000 South / 700 East	Signal	-	21.6	С
Dusty Creek Avenue / 700 East	WB Stop	WBL	31.8	d
700 East / 11400 South	Signal	-	48.5	D

Table 3: Mitigated Existing (2020) Background Evening Peak Hour LOS

1. Movement indicated for unsignalized intersections where delay and LOS represents worst movement. SBL = Southbound left movement, etc. 2. Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for non-AWSC intersections.

Source: Hales Engineering, June 2020

III. PROJECT CONDITIONS

A. Purpose

The project conditions discussion explains the type and intensity of development. This provides the basis for trip generation, distribution, and assignment of project trips to the surrounding study intersections defined in Chapter I.

B. Project Description

The proposed Orchards at Farnsworth Farms development is located on the west side of 700 East in between 11000 South and 11400 South. The development will consist of townhomes. A concept plan for the proposed development is provided in Appendix C.

The proposed land use for the development has been identified as follows:

• Townhomes 116 Units

C. Trip Generation

Trip generation for the development was calculated using trip generation rates published in the Institute of Transportation Engineers (ITE), *Trip Generation*, 10th Edition, 2017. Trip generation for the proposed project is included in Table 4.

The total trip generation for the development is as follows:

•	Daily Trips:	838
•	Morning Peak Hour Trips:	56
•	Evening Peak Hour Trips:	68

D. Trip Distribution and Assignment

Project traffic is assigned to the roadway network based on the type of trip and the proximity of project access points to major streets, high population densities, and regional trip attractions. Existing travel patterns observed during data collection also provide helpful guidance to establishing these distribution percentages, especially near the site. The resulting distribution of project generated trips during the evening peak hour is as follows:

To/From Project:

- 20% North
- 25% South
- 45% West
- 10% East

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Weekday Daily	# of	Unit	Trip	%	%	Trips	Trips	Total Daily
Land Use ¹	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Trips
Multifamily Housing (Low-Rise) (220)	116	Dwelling Units	838	50%	50%	419	419	838
Morning Peak Hour	# of	Unit	Trip	%	%	Trips	Trips	Total a.m.
Land Use ¹	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Trips
Multifamily Housing (Low-Rise) (220)	116	Dwelling Units	56	23%	77%	13	43	56
Evening Peak Hour	# of	Unit	Trip	%	%	Trips	Trips	Total p.m.
Land Use ¹	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Trips
Multifamily Housing (Low-Rise) (220)	116	Dwelling Units	68	63%	37%	43	25	68

Table 4: Trip Generation

These trip distribution assumptions were used to assign the evening peak hour generated traffic at the study intersections to create trip assignment for the proposed development. Trip assignment for the development is shown in Figure 4.

E. Access

The proposed access for the site will be gained at the following locations (see also concept plan in Appendix C):

700 East:

- The North Access will be located approximately 800 feet south of 11000 South. It will access the project on the west side of 700 East. This will be a right-in, right-out (RIRO) access based on conversations with UDOT.
- The South Access will be located approximately 1,100 feet north of 11400 South and 200 feet north of Dusty Creek Avenue. It will access the project on the west side of 700 East. It is recommended that this access also be RIRO due to the close offset with Dusty Creek Avenue to avoid left-turn conflicts. This resulted in assigning project trips to make U-turns at 11000 South and 11400 South in order to travel to/from the project.

Sandy Orchards at Farnsworth Farms TIS Trip Assignment

Evening Peak Hour Figure 4



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F. Auxiliary Lane Requirements

Based on Administrative Rule R930-6, the following auxiliary lanes may be required for the proposed accesses onto 700 East (UDOT Access Category 5 roadway):

Right-turn Deceleration Lane:

• Required when the projected peak hour right-turn ingress volume is greater than 25 vph. As shown in Figure 4, it is not anticipated that this peak hour volume will be met during the evening peak hour at the accesses onto 700 East. Therefore, right-turn deceleration lanes are <u>not</u> recommended at either access.

Right-turn Acceleration Lane:

• Required when the projected peak hour right-turn egress volume is greater than 50 vph when the posted speed limit on the highway is greater than 40 mph. As shown in Figure 4, it is not anticipated that this peak hour volume will be met during the evening peak hour at the accesses onto 700 East. Therefore, a right-turn acceleration lane is not recommended at this location.

IV. EXISTING (2020) PLUS PROJECT CONDITIONS

A. Purpose

The purpose of the existing (2020) plus project analysis is to study the intersections and roadways during the peak travel periods of the day for existing background traffic and geometric conditions plus the net trips generated by the proposed development. This scenario provides valuable insight into the potential impacts of the proposed project on background traffic conditions.

B. Traffic Volumes

Hales Engineering added the project trips to the existing (2020) background traffic volumes to predict turning movement volumes for existing (2020) plus project conditions. Existing (2020) plus project evening peak hour turning movement volumes are shown in Figure 5.

C. Level of Service Analysis

Hales Engineering determined that all intersections are anticipated to operate at acceptable levels of service during the evening peak hour with project traffic added, as shown in Table 5.

Intersection	Lev	el of Service		
Description	Control	Movement ¹	Aver. Delay (Sec/Veh)	LOS ²
11000 South / 700 East	Signal	-	21.4	С
Dusty Creek Avenue / 700 East	WB Stop	WBL	29.7	d
700 East / 11400 South	Signal	-	50.1	D
North Access / 700 East	EB Stop	EBR	4.6	а
South Access / 700 East	EB Stop	EBR	5.2	а

Table 5: Existing (2020) Plus Project Evening Peak Hour LOS

Movement indicated for unsignalized intersections where delay and LOS represents worst movement. SBL = Southbound left movement, etc.
 Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for non-AWSC intersections.

Source: Hales Engineering, June 2020

D. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. No significant queuing is anticipated during the evening peak hour.

E. Mitigation Measures

No additional mitigation measures are recommended at this time.

Sandy Orchards at Farnsworth Farms TIS Existing (2020) Plus Project

Evening Peak Hour Figure 5



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F. Recommended Storage Lengths

Hales Engineering determined recommended storage lengths based on the 95th percentile queue lengths given in the existing (2020) plus project scenario. These storage lengths do not include the taper length. Recommended storage lengths for the study intersections are shown in Table 6. Intersections shown in Table 6 include new intersections and existing intersections that have recommended storage length changes.

Recommended Storage Lengths Sandy - Orchards at Farnsworth Farms TIS									
Storage Length (feet)									
Intersection	Northbound		South	bound East		ound	Westbound		
	LT	RT	LT	RT	LT	RT	LT	RT	
700 East / 11400 South	-	-	-	-	400	-	250	-	
Source: Hales Engineering, June 2020									

Table 6: Recommended Storage Lengths



APPENDIX A

Turning Movement Counts









APPENDIX B LOS Results

Project: Analysis Period: Time Period: Sandy Orchards at Farnsworth Farms TIS Existing (2020) Background Evening Peak Hour

Project #: UT20-1646

Intersectio Type:	n:	700 E & 1100 Signalized	0 S			
Annroach	Maxamant	Demand	Volume	Served	Delay/Ve	h (sec)
Approach	wovement	Volume	Avg	%	Avg	LOS
	L	70	69	99	26.3	С
	Т	1,020	1,004	98	14.0	В
	R	55	57	104	7.0	А
	Subtotal	1,145	1,130	99	14.4	В
	L	171	173	101	65.6	E
C P	Т	723	707	98	13.0	В
30	R	81	80	98	4.3	Α
	Subtotal	975	960	98	21.8	С
	L	76	74	97	49.2	D
ED	Т	210	212	101	37.7	D
ED	R	50	49	98	6.7	Α
	Subtotal	336	335	100	35.7	D
	L	75	76	101	49.2	D
\//B	Т	180	184	102	38.9	D
VV D	R	111	111	100	12.8	В
	Subtotal	366	371	101	33.2	С
Total		2,823	2,796	99	22.0	С

Intersectio Type:	n:	700 E & Dusty Unsignalized	y Creek Ave			
Ammunach	Marramant	Demand	Volume	Served	Delay/Ve	h (sec)
Approach	movement	Volume	Avg	%	Avg	LOS
	Т	1,090	1,081	99	4.5	А
	R	50	47	94	4.4	Α
IND						
	Subtotal	1,140	1,128	99	4.5	Α
	L	35	34	97	13.6	В
	Т	838	824	98	2.9	Α
58						
	Subtotal	873	858	98	3.3	Α
	L	30	30	100	31.7	D
	R	30	29	97	9.6	Α
WB						
	Subtotal	60	59	98	20.8	С
Total		2,073	2,045	99	4.5	A

Project: Analysis Period: Time Period: Sandy Orchards at Farnsworth Farms TIS Existing (2020) Background Evening Peak Hour Proje

Intersectio	n:	700 E & 1140 Signalized	0 S			
Anna a ch	Maxamant	Demand	Volume	e Served	Delay/Ve	h (sec)
Approach	wovement	Volume	Avg	%	Avg	LOS
	L	255	262	103	80.9	F
NB	Т	630	628	100	46.1	D
IND	R	230	229	100	24.0	С
	Subtotal	1,115	1,119	100	49.7	D
	L	186	190	102	86.6	F
SB	Т	550	542	99	48.5	D
50	R	157	150	96	16.0	В
	Subtotal	893	882	99	51.2	D
	L	269	262	97	223.8	F
ED	Т	1,060	1,045	99	56.7	E
LD	R	140	141	101	15.6	В
	Subtotal	1,469	1,448	99	82.9	F
	L	190	192	101	76.2	E
	Т	845	835	99	42.5	D
VV D	R	216	215	99	17.0	В
	Subtotal	1,251	1,242	99	43.3	D
Total		4,728	4,691	99	59.3	E

1: 700 E & 11000 S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0
Denied Del/Veh (s)	3.0	0.5	3.0	3.0	0.5	2.9	0.1	0.0	0.1	2.3	0.3	2.2
Total Delay (hr)	1.0	2.2	0.1	1.1	2.0	0.4	0.5	4.0	0.1	3.2	2.6	0.1
Total Del/Veh (s)	49.2	37.7	6.7	49.2	38.9	12.8	26.3	14.0	7.0	65.6	13.0	4.3
Vehicles Entered	74	211	49	76	183	111	70	1007	58	172	712	80
Vehicles Exited	74	212	49	76	184	111	69	1004	57	173	707	80
Hourly Exit Rate	74	212	49	76	184	111	69	1004	57	173	707	80
Input Volume	76	210	50	75	180	111	70	1020	55	171	723	81
% of Volume	97	101	98	101	102	100	99	98	104	101	98	98

1: 700 E & 11000 S Performance by movement

Movement	All
Denied Delay (hr)	0.5
Denied Del/Veh (s)	0.7
Total Delay (hr)	17.3
Total Del/Veh (s)	22.0
Vehicles Entered	2803
Vehicles Exited	2796
Hourly Exit Rate	2796
Input Volume	2823
% of Volume	99

2: 700 E & Dusty Creek Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	4.1	0.0	0.0	0.1	0.0	0.1
Total Delay (hr)	0.3	0.1	1.3	0.1	0.1	0.7	2.6
Total Del/Veh (s)	31.7	9.6	4.5	4.4	13.6	2.9	4.5
Vehicles Entered	29	29	1080	47	34	822	2041
Vehicles Exited	30	29	1081	47	34	824	2045
Hourly Exit Rate	30	29	1081	47	34	824	2045
Input Volume	30	30	1090	50	35	838	2073
% of Volume	100	97	99	94	97	98	99

3: 700 E & 11400 S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	2.5	0.5	2.4	2.3	0.4	2.2	2.2	0.4	2.1	0.2	0.0	0.1
Total Delay (hr)	17.8	16.8	0.6	4.2	10.1	1.0	6.0	8.3	1.5	4.6	7.4	0.7
Total Del/Veh (s)	223.8	56.7	15.6	76.2	42.5	17.0	80.9	46.1	24.0	86.6	48.5	16.0
Vehicles Entered	274	1046	141	194	838	215	263	629	228	191	538	150
Vehicles Exited	262	1045	141	192	835	215	262	628	229	190	542	150
Hourly Exit Rate	262	1045	141	192	835	215	262	628	229	190	542	150
Input Volume	269	1060	140	190	845	216	255	630	230	186	550	157
% of Volume	97	99	101	101	99	99	103	100	100	102	99	96

3: 700 E & 11400 S Performance by movement

Movement	All
Denied Delay (hr)	1.1
Denied Del/Veh (s)	0.9
Total Delay (hr)	79.0
Total Del/Veh (s)	59.3
Vehicles Entered	4707
Vehicles Exited	4691
Hourly Exit Rate	4691
Input Volume	4728
% of Volume	99

Total Network Performance

Denied Delay (hr)	1.7
Denied Del/Veh (s)	1.1
Total Delay (hr)	104.8
Total Del/Veh (s)	64.6
Vehicles Entered	5650
Vehicles Exited	5631
Hourly Exit Rate	5631
Input Volume	15297
% of Volume	37

Intersection: 1: 700 E & 11000 S

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	Т	R	L	Т	R	L	Т	Т	R	L	Т
Maximum Queue (ft)	161	239	116	173	274	166	188	360	354	159	224	360
Average Queue (ft)	55	126	20	60	118	47	42	127	141	14	114	134
95th Queue (ft)	112	208	70	125	216	121	111	281	293	71	214	337
Link Distance (ft)		1546			1422			1600	1600			1702
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100		125	125		100	100			225	100	
Storage Blk Time (%)	2	17		0	14	0	0	9	3		25	7
Queuing Penalty (veh)	6	22		1	26	1	2	6	1		92	12

Intersection: 1: 700 E & 11000 S

Movement	SB	SB
Directions Served	Т	R
Maximum Queue (ft)	333	53
Average Queue (ft)	107	13
95th Queue (ft)	302	37
Link Distance (ft)	1702	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		225
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 2: 700 E & Dusty Creek Ave

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	Т	TR	L	Т
Maximum Queue (ft)	72	68	6	13	60	20
Average Queue (ft)	26	22	0	1	18	1
95th Queue (ft)	60	53	6	7	49	20
Link Distance (ft)	691		887	887		1600
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50			50	
Storage Blk Time (%)	5	1			1	0
Queuing Penalty (veh)	1	0			6	0

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	Т	Т	R	L	Т	Т	R	L	L	Т	Т
Maximum Queue (ft)	350	933	895	375	200	498	474	225	224	316	399	347
Average Queue (ft)	314	613	568	115	168	303	283	154	122	162	223	215
95th Queue (ft)	426	1119	1051	360	242	449	434	289	211	262	334	319
Link Distance (ft)		1252	1252			1527	1527				1767	1767
Upstream Blk Time (%)		2	0									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (ft)	275			125	100			100	200	200		
Storage Blk Time (%)	57	13	44	0	35	41	38	2	2	4	13	5
Queuing Penalty (veh)	303	35	62	0	151	78	81	8	5	13	34	11

Intersection: 3: 700 E & 11400 S

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	L	Т	Т	R
Maximum Queue (ft)	274	184	248	340	327	185
Average Queue (ft)	107	93	122	195	200	63
95th Queue (ft)	209	167	224	289	286	128
Link Distance (ft)				887	887	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	250	125	125			250
Storage Blk Time (%)	0	6	10	25	3	
Queuing Penalty (veh)	0	16	27	47	5	

Network Summary

Network wide Queuing Penalty: 1057

Project: Analysis Period: Time Period: Sandy Orchards at Farnsworth Farms TIS Mitigated Existing (2020) Background Evening Peak Hour Proje

Intersectio Type:	n:	700 E & 1100 Signalized	DS				
Annroach	Mexamont	Demand	Volume	e Served	Delay/Veh (sec)		
Approach	wovement	Volume	Avg	%	Avg	LOS	
	L	70	64	91	23.9	С	
NB	Т	1,020	1,012	99	18.4	В	
IND	R	55	56	102	8.3	А	
	Subtotal	1,145	1,132	99	18.2	В	
	L	171	174	102	23.1	С	
SB	Т	723	718	99	8.7	A	
SB	R	81	81	100	3.5	Α	
	Subtotal	81 8 975 97	973	100	10.8	В	
	L	76	76	100	58.9	E	
ED	Т	210	214	102	43.9	D	
ED	R	50	51	101	7.6	A	
	Subtotal	336	341	101	41.8	D	
	L	75	70	93	82.6	F	
W/B	Т	180	178	99	43.9	D	
VV D	R	111	115	103	14.4	В	
	Subtotal	366	363	99	42.0	D	
Total		2,823	2,809	100	21.6	С	

Intersectio Type:	n:	700 E & Dusty Creek Ave Unsignalized										
American	Maxamant	Demand	Volume	Served	Delay/Veh (sec)							
Approach	wovement	Volume	Avg	%	Avg	LOS						
	Т	1,090	1,074	99	4.4	Α						
	R	50	49	98	4.1	Α						
IND												
	Subtotal	1,140	1,123	99	4.4	Α						
	L	35	30	86	13.3	В						
CD	Т	838	837	100	2.7	Α						
30												
	Subtotal	873	867	99	3.1	Α						
	L	30	29	97	31.8	D						
	R	30	31	103	9.7	Α						
VVD												
	Subtotal	60	60	100	20.4	С						
Total		2,073	2,050	99	4.3	A						

HALES DENGINEERING

SimTraffic LOS Report

Project: Analysis Period: Time Period: Sandy Orchards at Farnsworth Farms TIS Mitigated Existing (2020) Background Evening Peak Hour Proje

Intersection Type:	n:	700 E & 11400 Signalized) S			
Annroach	Maxamant	Demand	Volume	e Served	Delay/Ve	h (sec)
Approach	wovement	Volume	Avg	%	Avg	LOS
	L	255	258	101	107.3	F
NB	Т	630	616	98	48.5	D
ND	R	230	223	97	21.4	С
	Subtotal	1,115	1,097	98	56.8	E
	L I	186	184	99	104.9	F
SB	Т	550	548	100	48.2	D
55	R	157	157	100	17.3	В
	Subtotal	893	1,097 184 548 157 889 271 1,048	100	54.5	D
	L	269	271	101	58.2	E
ED	Т	1,060	1,048	99	41.1	D
	R	140	138	99	10.5	В
	Subtotal	1,469	1,457	99	41.4	D
	L	190	183	96	65.6	E
	Т	845	850	101	46.9	D
VV D	R	216	209	97	19.2	В
	Subtotal	1,251	1,242	99	45.0	D
Total		4,728	4,685	99	48.5	D

1: 700 E & 11000 S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0
Denied Del/Veh (s)	3.0	0.5	2.9	3.0	0.6	2.9	0.1	0.0	0.1	2.3	0.3	2.1
Total Delay (hr)	1.3	2.6	0.1	1.7	2.2	0.5	0.4	5.2	0.1	1.1	1.7	0.1
Total Del/Veh (s)	58.9	43.9	7.6	82.6	43.9	14.4	23.9	18.4	8.3	23.1	8.7	3.5
Vehicles Entered	76	212	51	70	177	115	64	1008	56	175	716	81
Vehicles Exited	76	214	51	70	178	115	64	1012	56	174	718	81
Hourly Exit Rate	76	214	51	70	178	115	64	1012	56	174	718	81
Input Volume	76	210	50	75	180	111	70	1020	55	171	723	81
% of Volume	100	102	101	93	99	103	91	99	102	102	99	100

1: 700 E & 11000 S Performance by movement

Movement	All
Denied Delay (hr)	0.5
Denied Del/Veh (s)	0.7
Total Delay (hr)	17.1
Total Del/Veh (s)	21.6
Vehicles Entered	2801
Vehicles Exited	2809
Hourly Exit Rate	2809
Input Volume	2823
% of Volume	100

2: 700 E & Dusty Creek Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	4.2	0.0	0.0	0.1	0.0	0.1
Total Delay (hr)	0.3	0.1	1.3	0.1	0.1	0.6	2.5
Total Del/Veh (s)	31.8	9.7	4.4	4.1	13.3	2.7	4.3
Vehicles Entered	29	30	1072	49	30	836	2046
Vehicles Exited	29	31	1074	49	30	837	2050
Hourly Exit Rate	29	31	1074	49	30	837	2050
Input Volume	30	30	1090	50	35	838	2073
% of Volume	97	103	99	98	86	100	99

3: 700 E & 11400 S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	2.4	0.4	2.3	2.3	0.4	2.2	2.2	0.4	2.1	0.2	0.0	0.1
Total Delay (hr)	4.5	12.1	0.4	3.4	11.3	1.1	7.9	8.6	1.3	5.4	7.6	0.8
Total Del/Veh (s)	58.2	41.1	10.5	65.6	46.9	19.2	107.3	48.5	21.4	104.9	48.2	17.3
Vehicles Entered	271	1047	139	184	851	208	262	621	223	184	550	156
Vehicles Exited	271	1048	138	183	850	209	258	616	223	184	548	157
Hourly Exit Rate	271	1048	138	183	850	209	258	616	223	184	548	157
Input Volume	269	1060	140	190	845	216	255	630	230	186	550	157
% of Volume	101	99	99	96	101	97	101	98	97	99	100	100

3: 700 E & 11400 S Performance by movement

Movement	All
Denied Delay (hr)	1.1
Denied Del/Veh (s)	0.8
Total Delay (hr)	64.5
Total Del/Veh (s)	48.5
Vehicles Entered	4696
Vehicles Exited	4685
Hourly Exit Rate	4685
Input Volume	4728
% of Volume	99

Total Network Performance

Denied Delay (hr)	1.7
Denied Del/Veh (s)	1.1
Total Delay (hr)	90.1
Total Del/Veh (s)	55.7
Vehicles Entered	5637
Vehicles Exited	5634
Hourly Exit Rate	5634
Input Volume	15297
% of Volume	37

Intersection: 1: 700 E & 11000 S

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	Т	R	L	Т	R	L	Т	Т	R	L	Т
Maximum Queue (ft)	171	266	152	158	272	174	189	360	369	215	155	166
Average Queue (ft)	64	140	27	68	121	50	40	163	179	24	70	82
95th Queue (ft)	136	231	95	138	232	124	115	326	339	126	124	147
Link Distance (ft)		1546			1422			1600	1600			1702
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100		125	125		100	100			225	100	
Storage Blk Time (%)	4	21		4	14	0	1	14	5		4	3
Queuing Penalty (veh)	9	27		13	26	1	3	10	3		13	5

Intersection: 1: 700 E & 11000 S

Movement	SB	SB
Directions Served	Т	R
Maximum Queue (ft)	157	47
Average Queue (ft)	66	12
95th Queue (ft)	133	35
Link Distance (ft)	1702	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		225
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: 700 E & Dusty Creek Ave

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	Т	TR	L
Maximum Queue (ft)	65	72	9	13	60
Average Queue (ft)	24	23	0	1	16
95th Queue (ft)	57	56	7	7	47
Link Distance (ft)	691		887	887	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			50
Storage Blk Time (%)	5	1			1
Queuing Penalty (veh)	1	0			5

Intersection: 3: 700 E & 11400 S

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	Т	Т	R	L	Т	Т	R	L	L	Т	Т
Maximum Queue (ft)	350	533	510	374	200	538	512	225	234	317	480	460
Average Queue (ft)	224	327	307	62	165	328	314	148	135	174	250	240
95th Queue (ft)	378	480	449	227	246	481	468	289	231	293	451	419
Link Distance (ft)		1252	1252			1527	1527				1767	1767
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	275			125	100			100	200	200		
Storage Blk Time (%)	4	14	36	0	26	45	41	2	7	10	13	5
Queuing Penalty (veh)	22	38	50	0	108	86	89	8	23	33	33	12

Intersection: 3: 700 E & 11400 S

NB	SB	SB	SB	SB	SB
R	L	L	Т	Т	R
281	178	250	352	350	210
95	98	132	196	203	66
192	170	234	310	305	142
			887	887	
250	125	125			250
0	9	14	25	4	
0	25	39	47	6	
	NB R 281 95 192 250 0 0	NB SB R L 281 178 95 98 192 170 250 125 0 9 0 25	NB SB SB R L L 281 178 250 95 98 132 192 170 234	NB SB SB SB R L L T 281 178 250 352 95 98 132 196 192 170 234 310 887 887 887 250 125 125 0 9 14 25 0 25 39 47	NB SB SB SB SB SB R L L T T 281 178 250 352 350 95 98 132 196 203 192 170 234 310 305 887 887 887 250 125 125 250 125 125 4 0 9 14 25 4 0 25 39 47 6

Network Summary

Network wide Queuing Penalty: 736

Project: Analysis Period: Time Period: Sandy Orchards at Farnsworth Farms TIS Existing (2020) Plus Project Evening Peak Hour Project

Intersectio Type:	n:	700 E & 1100 Signalized	0 S			
Annroach	Mexement	Demand	Volume	e Served	Delay/Ve	h (sec)
Approach	wovement	Volume	Avg	%	Avg	LOS
	L	72	72	100	26.9	С
	Т	1,025	1,054	103	17.6	В
IND	R	56	55	99	6.5	А
	Subtotal	1,153	1,181	102	17.7	В
	L	171	172	101	24.5	С
CD	Т	732	728	99	9.0	A
55	R	81	81	100	3.4	А
	Subtotal	984	981	100	11.3	В
	L	76	77	101	64.6	E
ED	Т	210	210	100	43.7	D
LD	R	54	56	104	8.1	A
	Subtotal	340	343	101	42.6	D
	L	77	79	102	75.2	E
\//B	Т	180	170	94	41.4	D
VV D	R	111	110	99	14.8	В
	Subtotal	368	359	98	40.7	D
Total		2,874	2,890	101	21.4	С

Intersectio Type:	n:	700 E & Dusty Unsignalized	y Creek Ave			
Annroach	Maxamant	Demand	Volume	Served	Delay/Ve	h (sec)
Approach	wovement	Volume	Avg	%	Avg	LOS
	Т	1,126	1,148	102	4.6	A
NB	R	50	55	109	4.4	A
	Subtotal	1,176	1,203	102	4.6	А
	L	35	34	97	12.8	В
SB	Т	864	862	100	0.3	A
	Subtotal	899	896	100	0.8	A
	L	30	30	100	29.7	D
WB	R	30	36	120	8.6	А
	Subtotal	60	66	110	18.2	С
Total		2,135	2,165	101	3.4	A

Project: Analysis Period: Time Period: Sandy Orchards at Farnsworth Farms TIS Existing (2020) Plus Project Evening Peak Hour Project #: UT20-1646

Intersection Type:	n:	700 E & 1140 Signalized	0 S			
Annroach	Mexement	Demand	Volume	Served	Delay/Ve	h (sec)
Approach	wovement	Volume	Avg	%	Avg	LOS
	L	255	257	101	102.9	F
	Т	641	654	102	47.7	D
ND	R	230	224	97	23.8	С
	Subtotal	1,126	1,135	101	55.5	E
	L	187	187	100	112.0	F
C P	Т	557	558	100	47.8	D
56	R	166	175	106	18.1	В
	Subtotal	910	920	101	55.2	E
	L	284	299	105	66.4	E
EB	Т	1,060	1,067	101	43.7	D
LD	R	140	144	103	11.1	В
	Subtotal	1,484	1,510	102	45.1	D
	L	190	188	99	70.5	E
	Т	845	851	101	48.6	D
VV D	R	218	220	101	21.0	С
	Subtotal	1,253	1,259	100	47.0	D
Total		4,781	4,831	101	50.1	D

Intersectio Type:	n:	700 E & North Unsignalized	Access			
Approach	Movement	Demand	Volume	Served	Delay/Ve	h (sec)
Approach	wovement	Volume	Avg	%	Avg	LOS
	Т	1,156	1,183	102	0.8	A
NB						
	Subtotal	1,156	1,183	102	0.8	А
	Т	895	899	100	2.1	А
SB	R	22	19	87	1.5	А
50						
	Subtotal	917	918	100	2.1	A
	R	12	8	65	4.6	Α
EB						
	Subtotal	12	8	67	4.6	А
Total		2,085	2,109	101	1.4	А

Project: Analysis Period: Time Period: Sandy Orchards at Farnsworth Farms TIS Existing (2020) Plus Project Evening Peak Hour Projec

Intersection Type:	n:	700 E & Soutl Unsignalized	n Access			
		Demand	Volume	Served	Delay/Ve	h (sec)
Approach	Movement	Volume	Avg	%	Avg	LOS
	Т	1,156	1,184	102	0.4	A
NB						
	Subtotal	1,156	1,184	102	0.4	А
	Т	886	883	100	0.9	А
SB	R	21	22	106	0.5	А
	Subtotal	907	905	100	0.9	А
	R	13	12	91	5.2	A
EB						
	Subtotal	13	12	92	5.2	A
Total		2,076	2,101	101	0.6	A

1: 700 E & 11000 S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Denied Delay (hr)	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1
Denied Del/Veh (s)	2.9	0.5	2.8	2.9	0.6	3.0	0.1	0.1	0.0	0.1	2.3	0.3
Total Delay (hr)	1.4	2.6	0.1	1.7	2.0	0.5	0.2	0.5	5.2	0.1	1.2	1.8
Total Del/Veh (s)	64.6	43.7	8.1	75.2	41.4	14.8	22.3	26.9	17.6	6.5	24.5	9.0
Vehicles Entered	77	210	56	78	170	110	26	72	1053	55	172	726
Vehicles Exited	77	210	56	79	170	110	26	72	1054	55	172	728
Hourly Exit Rate	77	210	56	79	170	110	26	72	1054	55	172	728
Input Volume	76	210	54	77	180	111	28	72	1025	56	171	732
% of Volume	101	100	104	102	94	99	94	100	103	99	101	99

1: 700 E & 11000 S Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.1	0.5
Denied Del/Veh (s)	2.3	0.7
Total Delay (hr)	0.1	17.3
Total Del/Veh (s)	3.4	21.4
Vehicles Entered	81	2886
Vehicles Exited	81	2890
Hourly Exit Rate	81	2890
Input Volume	81	2874
% of Volume	100	101

2: 700 E & Dusty Creek Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	4.0	0.0	0.0	0.0	0.0	0.1
Total Delay (hr)	0.2	0.1	1.5	0.1	0.1	0.1	2.1
Total Del/Veh (s)	29.7	8.6	4.6	4.4	12.8	0.3	3.4
Vehicles Entered	30	36	1149	55	33	862	2165
Vehicles Exited	30	36	1148	55	34	862	2165
Hourly Exit Rate	30	36	1148	55	34	862	2165
Input Volume	30	30	1126	50	35	864	2135
% of Volume	100	120	102	109	97	100	101

3: 700 E & 11400 S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Denied Delay (hr)	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	2.3	0.5	2.3	2.2	0.4	2.2	2.2	0.4	2.1	0.0	0.1	0.0
Total Delay (hr)	5.7	13.1	0.4	3.8	11.7	1.3	7.5	8.9	1.5	0.2	5.9	7.6
Total Del/Veh (s)	66.4	43.7	11.1	70.5	48.6	21.0	102.9	47.7	23.8	90.1	112.0	47.8
Vehicles Entered	299	1068	144	188	852	220	258	651	224	7	186	552
Vehicles Exited	299	1067	144	188	851	220	257	654	224	7	187	558
Hourly Exit Rate	299	1067	144	188	851	220	257	654	224	7	187	558
Input Volume	284	1060	140	190	845	218	255	641	230	8	187	557
% of Volume	105	101	103	99	101	101	101	102	97	85	100	100

3: 700 E & 11400 S Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.0	1.1
Denied Del/Veh (s)	0.1	0.8
Total Delay (hr)	0.9	68.4
Total Del/Veh (s)	18.1	50.1
Vehicles Entered	174	4823
Vehicles Exited	175	4831
Hourly Exit Rate	175	4831
Input Volume	166	4781
% of Volume	106	101

4: 700 E & North Access Performance by movement

Movement	EBR	NBT	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.3	0.5	0.0	0.8
Total Del/Veh (s)	4.6	0.8	2.1	1.5	1.4
Vehicles Entered	8	1183	897	19	2107
Vehicles Exited	8	1183	899	19	2109
Hourly Exit Rate	8	1183	899	19	2109
Input Volume	12	1156	895	22	2085
% of Volume	65	102	100	87	101

5: 700 E & South Access Performance by movement

Movement	EBR	NBT	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.1	0.2	0.0	0.4
Total Del/Veh (s)	5.2	0.4	0.9	0.5	0.6
Vehicles Entered	12	1184	884	22	2102
Vehicles Exited	12	1184	883	22	2101
Hourly Exit Rate	12	1184	883	22	2101
Input Volume	13	1156	886	21	2076
% of Volume	91	102	100	106	101

Total Network Performance

Denied Delay (hr)	1.7	
Denied Del/Veh (s)	1.1	
Total Delay (hr)	95.4	
Total Del/Veh (s)	57.6	
Vehicles Entered	5774	
Vehicles Exited	5782	
Hourly Exit Rate	5782	
Input Volume	19690	
% of Volume	29	

06/04/2020

Intersection: 1: 700 E & 11000 S

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	Т	R	L	Т	R	UL	Т	Т	R	L	Т
Maximum Queue (ft)	176	269	187	164	250	174	274	344	354	130	173	189
Average Queue (ft)	66	136	31	73	111	50	61	170	185	15	69	84
95th Queue (ft)	134	227	109	140	198	124	151	333	344	80	131	150
Link Distance (ft)		1546			1423			718	718			1702
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100		125	125		100	100			225	100	
Storage Blk Time (%)	5	21	0	3	12	1	1	14	5		4	3
Queuing Penalty (veh)	14	27	0	10	23	2	7	14	3		16	5

Intersection: 1: 700 E & 11000 S

Movement	SB	SB
Directions Served	Т	R
Maximum Queue (ft)	154	46
Average Queue (ft)	72	11
95th Queue (ft)	134	32
Link Distance (ft)	1702	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		225
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: 700 E & Dusty Creek Ave

Movement	WB	WB	NB	SB
Directions Served	L	R	TR	L
Maximum Queue (ft)	72	66	16	56
Average Queue (ft)	25	26	1	19
95th Queue (ft)	58	56	8	49
Link Distance (ft)	692		901	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		50		75
Storage Blk Time (%)	4	1		0
Queuing Penalty (veh)	1	0		1

Intersection: 3: 700 E & 11400 S

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	Т	Т	R	L	Т	Т	R	L	L	Т	Т
Maximum Queue (ft)	350	597	569	375	200	540	547	225	237	324	405	368
Average Queue (ft)	251	355	332	83	164	337	323	149	137	174	242	225
95th Queue (ft)	398	537	501	288	242	499	487	288	235	289	358	323
Link Distance (ft)		1252	1252			1527	1527				1767	1767
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	275			125	100			100	200	200		
Storage Blk Time (%)	7	15	37	0	30	45	42	3	6	10	16	5
Queuing Penalty (veh)	40	44	52	0	128	86	91	14	20	32	40	13

Intersection: 3: 700 E & 11400 S

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	UL	L	Т	Т	R
Maximum Queue (ft)	235	182	247	352	341	232
Average Queue (ft)	100	105	138	202	205	78
95th Queue (ft)	185	177	240	303	291	161
Link Distance (ft)				901	901	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	250	125	125			250
Storage Blk Time (%)	0	12	17	25	3	
Queuing Penalty (veh)	0	34	47	50	5	

Intersection: 4: 700 E & North Access

Movement	EB
Directions Served	R
Maximum Queue (ft)	33
Average Queue (ft)	7
95th Queue (ft)	29
Link Distance (ft)	309
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: 700 E & South Access

Movement	EB	SB
Directions Served	R	Т
Maximum Queue (ft)	33	6
Average Queue (ft)	10	0
95th Queue (ft)	34	6
Link Distance (ft)	347	596
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 819



APPENDIX C Site Plan





APPENDIX D

95th Percentile Queue Length Reports

SimTraffic Queueing Report Project: Sandy Orchards at Farnsworth Farms TIS

Analysis: Existing (2020) Background

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet)

HALES DENGINEERING

	NB				SB			EB			WB		
Intersection	L	R	Т	TR	L	R	Т	L	R	Т	L	R	Τ
1: 700 E & 11000 S	111	71	287		214	37	320	112	70	208	125	121	216
2: 700 E & Dusty Creek Ave			6	7	49		20				60	53	
3: 700 E & 11400 S	237	209	327		196	128	288	426	360	1,085	242	289	442

SimTraffic Queueing Report

Project: Sandy Orchards at Farnsworth Farms TIS

Analysis: Mitigated Existing (2020) Background

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet)

HALES DENGINEERING

	NB				SB			EB			WB		
Intersection	L	R	Т	TR	L	R	Т	L	R	Т	L	R	Т
1: 700 E & 11000 S	115	126	333		124	35	140	136	95	231	138	124	232
2: 700 E & Dusty Creek Ave			7	7	47						57	56	
3: 700 E & 11400 S	262	192	435		202	142	308	378	227	465	246	289	475

SimTraffic Queueing Report

Project: Sandy Orchards at Farnsworth Farms TIS



Analysis: Existing (2020) Plus Project

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet)

	NB					SB				EB			WB		
Intersection	L	R	Т	TR	UL	L	R	Т	UL	L	R	Т	L	R	Т
1: 700 E & 11000 S		80	339		151	131	32	142		134	109	227	140	124	198
2: 700 E & Dusty Creek Ave				8		49							58	56	
3: 700 E & 11400 S	262	185	341			240	161	297	177	398	288	519	242	288	493
4: 700 E & North Access											29				
5: 700 E & South Access								6			34				